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Preventing
**INSECT
DAMAGE**
IN
HOME-DRIED
FRUITS

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PREVENTING INSECT DAMAGE IN HOME-DRIED FRUITS

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Dried fruits prepared at home, whether dried by the sun or by artificial heat and whether processed with sulfur dioxide or not, must be protected from attack by insects, including moths, beetles, and flies. This is needed both for products while they are drying, and for the dried products before and during storage. This leaflet tells how to prevent damage to home-dried fruits by the insects that are most likely to cause spoilage.

The Indian-meal moth and, in California and Arizona, the raisin moth lay their eggs on drying fruits in the evening. The dried-fruit beetle, active only during the day, is attracted especially to fruits that are moist or fermenting. A small, slender beetle called the saw-toothed grain beetle infests dried fruit that has been in storage for some time. Familiar to all are the small vinegar flies, or pomace flies, that swarm around most kinds of fruit and vegetable refuse. These flies, and the housefly and other similar species, feed upon the juices of drying cut fruits, thus reducing their quality, and also sometimes carry filth to freshly cut fruits on the drying trays. The dried-fruit mite—minute light-colored relative of the ticks—occasionally becomes established on stored dried fruits. When present in large numbers, these mites impart a disagreeable odor to the fruit.

Exclusion of Insects

Egg laying by moths and feeding by flies can be prevented during the drying process by screening. For this purpose cheesecloth or the open-weave shade cloth used over growing tobacco, asters, and chrysanthemums is satisfactory. Of special importance is the covering of trays of fruit in the late afternoon, before the moths become active. In some sections, fruit dried under cloth requires more time to dry than unprotected fruit. In arranging the cloth, support it in such a way as to keep it out of contact with the drying or dried fruit, and take care to fasten down the bottom edges by laying boards on them. Fruit on stacked trays or in open boxes should by all means be so protected. Where very hot, continuous sunshine occurs, infestation on spread trays is prevented during the day by high temperatures if the fruit is spread thinly, but such fruit is subject to attack by moths during the cooler hours of the evening.

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Use of High Temperatures

When properly applied, heat is effective in killing insects and mites infesting dried fruits. Hot water may be used for this purpose for prunes and "natural," or unsulfured, raisins. These fruits, placed in a cheesecloth bag, may be dipped in boiling water for 6 seconds to kill insects and their eggs and may then be dried thoroughly before being stored. Dry heat should be employed for treating figs and sulfured fruits. For dates, exposure to about 150° F. for 1 to 1½ hours has been found effective, the heat being obtained either in a sun-heated cabinet or in a kitchen oven. Some darkening, stickiness, and change in flavor are likely to be produced when dates are thus heated.

Cold Storage

Any temperature below 50° F. will keep dried-fruit insects from breeding and will prevent infestation of clean fruit. Temperatures of about freezing keep these insects inactive, but they may live for several weeks or longer. At around zero, death occurs within a few days. Persons having available refrigerated locker space can preserve small lots of dried fruits in this way. With raisins, some crystallization of sugar is likely to occur.

Fumigation

Although fumes of burning sulfur may be produced in sufficient concentration and over a long enough time to kill insects and their eggs, the usual sulfuring process cannot be depended on to do this. Fumigation can be done in any clean box or metal can capable of being tightly closed. For this purpose a clean galvanized-iron ashcan is well suited, the cover being sealed on with paper tape after the dried fruit and fumigant have been put in.

For the use of those who wish to fumigate small quantities of dried fruits there are several noninflammable liquid fumigants which are inexpensive and convenient to apply. One readily available mixture contains ethylene dichloride and carbon tetrachloride and is sold under several proprietary names. This mixture should be applied at the rate of about 2 teaspoonsfuls per cubic foot of space to be fumigated. It should be poured into a shallow pan placed above the fruit, and

the container should remain closed for at least 12 hours. Fumigation is most effective in hot weather.

All fumigating gases are poisonous, and care must be taken to avoid breathing them. The fumigation box or can should be well aired before the treated dried fruit is removed. The fumigation should not be carried on in the dwelling, but in an outhouse from which all members of the household and domestic animals can be excluded.

Storage Containers

The use of tight containers, such as glass fruit jars provided with insects and mites from attacking dried fruits. Fruits should be well rubber rings, friction-top metal cans of various sizes, and moisture-vapor-tight containers made for use in freezing storage, will keep

dried and free of infestation before being sealed up. Cylindrical paper cartons, such as those used for ice cream, have tight covers and also make suitable storage units for dried fruits. As an added precaution, the lids may be sealed with cellulose tape. Heavy paper bags can be made insect-tight by gluing down the folds at the bottom and folding the top over several times before fastening it with paper clips. Cloth bags cannot be depended on to exclude insects or mites during prolonged storage. In storing dried fruits it should be borne in mind that newly hatched storage insects are very small and that some are able to enter crevices only one-eighth millimeter wide, or about five one-thousandths of an inch.

Sanitation

Infested cereal products and stored grain, nuts, and fermenting fruit waste favor the multiplication of the kinds of insects that infest drying or dried fruits, and the elimination of breeding sources of this nature will aid in controlling insect infestations in home-dried fruits. Burial at a depth of 3 feet is recommended for control of insects breeding in waste fruits. In hot, dry climates the control can be accomplished simply by spreading waste fruits and fruit pits thinly in the sun.

Extreme care should be taken to eliminate sources of infestation present in any dried fruit remaining from the previous crop. Contaminated dried fruits and other infested materials should first be removed from the storage space. The shelves and floor should be carefully cleaned and all debris and sweepings burned. The glass, metal, or wooden containers previously used should be well cleaned and immersed for a few seconds in boiling water.

